Nutritional Needs and Health

Macro nutrients &

These are nutrients needed by the body in large amounts. (*Proteins, Fats and Carbohydrates*)

Micro nutrients

These are nutrients needed by the body in smaller amounts. These are Vitamins and Minerals

Nutrients	Function	Source
Carbohydrates	Gives the body energy	Sugar, honey, jam Potatoes, pasta, rice
Protein	Growth and repair of the body Secondary source of energy	Meat, fish, milk, eggs cheese, lentils, soya, nuts, wheat, beans and peas
Fat	Protection and insulation (warmth) of the body. Gives the body some energy	Butter, Cheese, Oily fish, meat
Vitamin A	Help eyes see in dim light Healthy skin and tissue	Liver, eggs, butter, soft spreads, carrots and apricots
Vitamin B	Transfer and release of energy Formation of red blood cells	Cereals, meat, fish, eggs, dairy products, pulses, yeast products
Vitamin C	Healthy skin. Helps the body heal faster and helps resist infection.	Fruit and vegetables e.g. oranges, lemons, blackcurrants
Vitamin D	Growth and maintenance of strong bones. Aids the absorption of calcium	Made by the body with skin exposed to sunlight, oily fish and eggs
Iron	Formation of red blood cells which carry oxygen around the body	Red meat, dark vegetables, eggs, chocolate, dried fruit, cereals
Calcium	Keeps bones and teeth strong Healthy muscles and nerves	Dairy foods, white bread, canned fish, green leafy vegetables
Water	For all body actions Removes waste products	Drinking water, fruits and milk

5 food groups on the Eatwell Guide

Food Energy per Day

Carbohydrates 50% - Fat 35% or less - Protein 15%

- Potatoes, bread, rice, pasta and other starchy carbohydrates
- Fruit and vegetables
- Dairy and alternatives
- Beans, pulses, fish, eggs, meat and other proteins
- Oils and spreads

Also we should drink 6 to 8 cups of water per day

BMR - Basal Metabolic Rate

Nutrient	% of food energy per day
Carbohydrate	50% ***Most of which*** should come from starch, intrinsic and milk sugars No more than 5% should come from intrinsic sugars from fruits and vegetables, and free sugars
Fat	35% or less
Protein	15%

PAL – Physical Activity Level

Age	Recommendation
Under 5 years old	A minimum of 3 hours of physical activity, spread throughout the day.
5–18 years	Physical activity for up to 60 minutes at a time, for several hours a day.
19–64 years	30 minutes of physical activity on at least 5 days a week, for a minimum of 10 minutes at a time.

Diet, Nutrition and Health

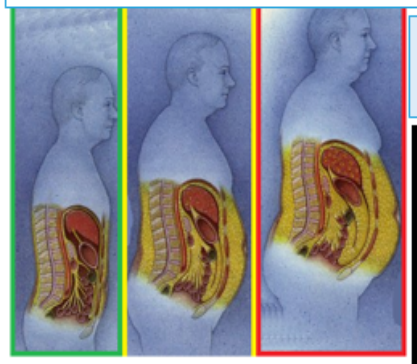
Obesity is a diet-related disease in which the body contains too much stored fat

It has become a very serious concern to health experts as more and more people are becoming obese all over the world

- Obesity is cause by **not being in energy balance,** if a person gets **more energy** from food than they use every day, the energy they do not use will be stored as fat and they will gradually become **overweight** and eventually **obese.**
- Many processed foods, ready-meals, snack foods, hot and cold drinks and fast foods are **energy dense** because they contain a lot of hidden fat and sugar.
- If the stored energy is not used for physical activity it will remain in the body

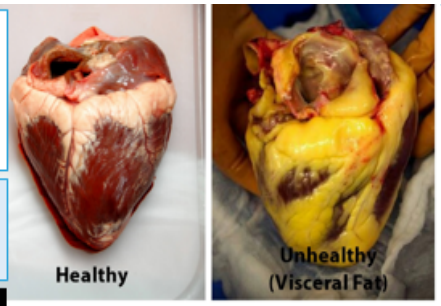
What happens to the body?

- The stored fat will build up under the skin as **adipose fat** and inside the body around the abdomen and intestines as **visceral fats.**
- Visceral fats eventually push up the diaphragm and squashes the lungs



The extra weight being carried puts the body at stress and strains certain organs like the heart, blood vessels, liver, kidneys, skeleton and muscles.

Visceral fats eventually push up the diaphragm and squashes the lungs



Obesity leads to other serious health conditions such as Type 2 diabetes, heart disease, breathing difficulties, high blood pressure, cancer and arthritis. This is where the joints in the knees and hips wear out and become very painful

FACT

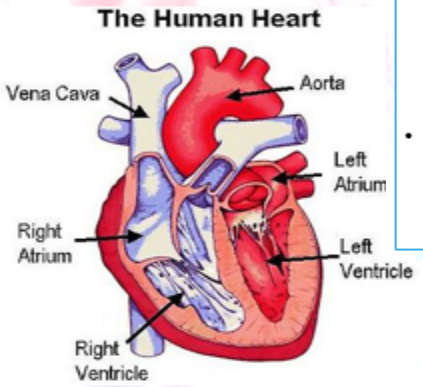
2015/16, show that 19.8% of children in Year 6 (aged 10-11) were obese and a further 14.3% were overweight.

The cardiovascular system is made up of the heart and blood vessels (veins, arteries and capillaries)

One disease that can affect the parts of this system is **coronary heart disease (CHD)**. The heart has its own blood supply that is brought to it by the coronary arteries.

High Blood Pressure

- The blood vessels carry blood all around the body, to and from the heart.
- The pressure of blood can be measured as it passes through the blood vessels, and during the day it will go up and down. This is normal!
- If it is consistently high, then it can be a concern as your body will be putting stress on certain organs and can cause damage to the eyes or kidneys, it could even lead to a stroke.



Risk Factors

- Too much salt in their diet. This will change the consistency and volume of the blood. It will mean the heart has to work extra hard to pump it round the body.
- Being overweigh or obese. This will put a strain on the heart as it tries to pump blood around the body.

Type 2 Diabetes

In order for all out cells to produce energy during respiration, they need a continual supply of **glucose**. This is a type of sugar.

- Glucose enters the bloodstream after it has been absorbed from the food we eat.

Insulin resistance and eventually Type 2 diabetes may develop from an unbalanced diet.
The pancreas has to keep producing insulin to deal with the large amounts of glucose that keep entering the bloodstream.

Symptoms

- ✓ Feeling thirsty
- ✓ Feeling tired and weak
- ✓ Weight loss
- ✓ Frequent urination
- ✓ Blurred vision

Diabetes can lead to permanent damage to parts of the body because of the excess glucose in the blood, including:

- ➢ Poor eyesight and eventual blindness
- ➢ Damage to the tiny blood vessels in the fingers and toes
- ➢ The skin may not heal properly if it gets infected and damaged.

Hygiene in Food Production

Frozen and chilled foods have become very popular with consumers, because they are quick and easy to prepare and serve. Improved quality of these products has increased their popularity.

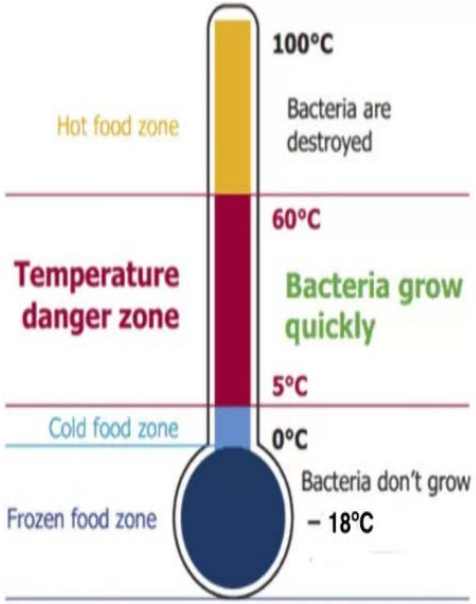
However care must be taken when reheating these foods to ensure they are safe to eat.

- Ensure frozen food is fully defrosted
- Follow the reheating instructions on the pack
- Make sure that it is heated to 72°C or above at the centre
- Dispose of unused food
- Only reheat food once
- Stir the product to avoid cold spots

Food Poisoning Bacteria

Bacteria	Symptoms	Main sources
Salmonella most common form of food poisoning	Diarrhoea, vomiting, headaches and stomach pains which occur 12 to 36 hours after eating affected food	Eggs and poultry
Campylobacter	Diarrhoea and headaches that occur 1-15 days after eating affected food	Meat, poultry and shellfish
Staphylococcus aureus. The bacteria creates toxins which cause food poisoning	Vomiting abdominal pains and diarrhoea	Meat, poultry and salads Found in the nose, throat and skin of humans so can be transferred by poor personal hygiene.
E Coli	Vomiting abdominal pains and diarrhoea	Soil, faeces (human and animal), raw meats, poultry, root vegetables and unwashed salads

Most bacteria grow rapidly at body temperature (37°C), but can grow between 5°C and 63°C. This is known as the danger zone. The more time food spends in the danger zone the greater the risks of harmful bacteria growing. Therefore it is vitally important that we try to keep food out of the danger zone during the production processes.

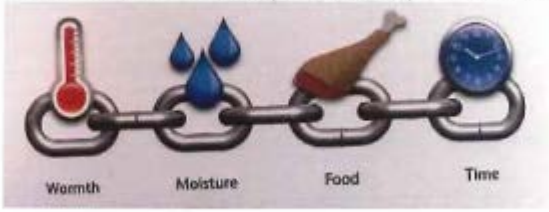


Food should be cooked to at least 72 °C at the centre to ensure it is safe to eat

Chilled foods should be stored at between 1°C and 5°C to slow the growth of bacteria

When food is frozen (below 0 °C) bacteria are dormant

Bacteria that cause food poisoning are known as pathogens
To grow bacteria need warmth, moisture, food and time.



These 4 elements are known as the Food Poisoning chain.

Key Terms

Hygiene	Keeping the workplace and food workers clean which ensures food is safe to eat
Hygiene procedure	The steps you would go through to ensure that a product is produced in a safe and hygienic way
Contamination	Presence in food of harmful substances or bacteria. To spoil or dirty something
Physical contamination	The presence of a foreign body in a food product for example a plaster that has fallen off the food workers hand
Chemical contamination	The presence of unwanted or unsafe chemicals in food
Biological contamination	The presence of harmful microorganisms in food
Danger zone	A temperature of between 5°C and 63°C when bacteria will grow most rapidly
Cross contamination	Safe food being contaminated by unsafe food.
Food poisoning	Chilled foods should be stored at between 1°C and 5°C to slow the growth of bacteria Illness caused by food being contaminated by microorganisms. Food poisoning occurs if harmful microorganisms contaminate food and are then allowed to grow.
Symptoms	The physical signs that are shown when someone is unwell

Personal Hygiene: Key points

- wear a clean apron or overall
- Wash hands thoroughly in hot water and liquid soap
- Always wash hand after handling raw food, waste or visiting the toilet
- Dry hands thoroughly using hand dryer or paper towels
- Never cough or smoke during food preparation
- Cover cuts with a blue coloured waterproof dressing
- Tie back long hair and cover with hair net
- Do not work with food if suffering from sickness or diarrhoea

Food Product Development & Packaging

Design specification

The design specification is the first attempt at listing the needs of the product. It includes:

- size
- shape
- shelf life
- weight
- sensory characteristics (taste, texture, appearance, etc)
- costs
- ingredients (with quantities)
- equipment

Initial ideas are generated following the design specification. These are then shortlisted based on **concept screening**, where five or six ideas are chosen, based on which ideas best meet the design specification.

Sensory testing

It is essential to test *sensory qualities*. The results are analysed so that the product can be improved or changed. This is called **sensory analysis**.

Ranking tests

Similar products are tested for a specific characteristic, for example saltiness. Samples are given randomly coded names, and testers sort the products from most to least salty.

Rating tests

Products are tested for a specific characteristic to find out if there is a noticeable difference between two products. For example, manufacturers can test a new low fat version of a product to see if it is similar to the original. The products are randomly coded and testers rate them using a scale:

1. dislike a lot
2. dislike a little
3. neither like or dislike
4. like a little
5. like a lot

In one type of test the testers are given two identical products and one different product. They are asked to pick the different product.

Profile test

The profile of a product can be recorded as a **star diagram**. Testers rate characteristics on a five point scale (1 being the lowest and 5 being the highest). The results are plotted on the star.

Manufacturing specification

The **manufacturing specification** lists information a manufacturer needs to produce the product. The specification records the stages of the production process, with details of all the **characteristics** (shape, size, texture, colour, flavour etc) required in the final product.

It also lists where **standard components** can be used. A standard component is a pre-prepared ingredient used in the production of a food product, like pizza bases or ready-made sauces.

By Law

1. Nutrition information (from December 2016)
2. Ingredients that are known food allergens
3. List of ingredients (in descending order)
4. The quantity of certain ingredients
5. The name of the food product
6. A description of the food product if it is not obvious to the consumer from the name what the food product actually is
7. Indication of minimum durability (the shelf-life of the food product) by 'use-by' or 'best-before' date
8. The net weight/quantity of the food product
9. Place of origin (provenance) of the food product or a specific ingredient
10. Cooking or usage instructions
11. Storage conditions and instructions
12. Contact details of food product manufacturer, distributor or retailer

Nutrient	Per 100g	Per serving (150mg)
Energy	586 kJ/140 kcal	879kJ/210kcal
Fat	1.5g	2.25g
of which:		
Saturates	0.2g	0.3g
Monounsaturates	0.9g	1.35g
Polyunsaturates	0.4g	0.6g
Carbohydrate	50.0g	75.0g
of which:		
Sugars	2.5g	3.25g
Starch	42.0g	63.0g
Fibre	5.5g	8.25g
Protein	8.0g	12.0g
Salt	0.2g	0.3g

Food packaging protects and preserves food. A range of materials can be used for packaging, some of which are environmentally friendly. Labels carry information for the consumer. Some of this information is required by law.

Packaging functions

The main purposes of food packaging are:

- to preserve the product
- to protect the product from damage
- to make the product more attractive to the consumer
- to make it easier to transport the product

RED means that the food product contains a HIGH amount of fat, saturated fat, sugars or salt.

AMBER means that the food product contains a MEDIUM amount of fat, saturated fat, sugars or salt.

GREEN means that the food product contains a LOW amount of fat, saturated fat, sugars or salt.

Food and the Environment

Environmental factors

Environmental factors are things that help reduce the impact of food production on the environment and might cause someone to choose to buy a product. For example, locally produced food doesn't have to be transported as far, so less CO_2 is produced. This means there is less of an impact on the environment.

Ethical factors

Ethical factors are things that can be seen as morally right. For example, buying fair trade food which provides farmers with better working conditions.

Some environmental and ethical factors are:

- **Fair trade** food production aims to provide fair prices and better working conditions for farmers and farm workers
- **Farm assured** means that the farms an food companies meet high standards of food safety and hygiene, animal welfare and environmental protection.
- **Food miles** means the distance that foc travels from where it is grown to where i is bought. This is an environmental concern because of the CO_2 emissions from transport.
- **Free range** is a method of farming where animals are allowed to roam freely.
- **Genetically modified** food is grown with genetic manipulation technology. Some people consider this a risk to the environment and choose GM-free products.
- **Organic** foods have been grown without the use of chemical fertilisers or pesticides.
- **Seasonal** foods means foods that are in season. Choosing these reduces food miles
- **Sustainability** is food production that aims to preserve the world's natural resources for future generations.

Social factors are things that affect **lifestyle**, such as religion, family or wealth. These can change over time. Food developers need to be aware of these changes to make foods that meet the needs of consumers.

For example, consumers now expect to find a wide range of foods. This is because:

- communities are more **multicultural**, meaning they are made up of different races and religions, often with their own traditional cuisines
- TV cookery programmes encourage people to try new foods
- increased travel abroad means exposure to new foods
- improved transportation and technology means less reliance on local or seasonal produce

Genetically Modified (GM) Foods

These are foods were the genes have been altered to improve the characteristics.

Advantages

The farmer can get a greater yield with out using more land.
Can improve crops by making them more resistant to diseases.
Less pesticides is needed due to insect pest resistant plants.
Crops can be GM modified to improve nutritional quality by adding vitamins and minerals to crops.
Creation of super foods, making them cheap to produce, grow fast in large quantities and are highly nutritious.
Reduce energy needs to produce GM crops. Less machinery requirements. Due to reduced costs of production, less additives needed, so therefore prices can be reduced.

Disadvantages

Scientists fear the unknown side effects of using (GM) foods over a long period of time, therefore more research is needed.
Some GM foods are thought to increase allergens eg. Nuts modified into soya beans.
There may be a link between GM foods and behavioural problems such as ADHD.
Crops grown near GM foods could be affected and this could be harmful to other organisms who eat them.
GM foods have to meet very complex standards.
Additional cost of labelling and this might increase costs of foods